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K/EM-304

SANITIZED VERSION OF CONTAMINANT CONTROL PRODUCTION DIVISION DATED NOVEMBER 3, 1954

(SANITIZED VERSION OF SRD DOCUMENT # KP-701)

Compiled by
S. G. Thornton
Environmental Management Division
OAK RIDGE K-25 SITE
for the Health Studies Agreement

December 18, 1995

Oak Ridge K-25 Site
Oak Ridge, Tennessee 37831-7314
managed by
LOCKHEED MARTIN ENERGY SYSTEMS, INC.
for the U.S. DEPARTMENT OF ENERGY
under Contract DE-AC05-84OR21400

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INTER-COMPANY CORRESPONDENCE

(INSERT NAME) COMPANY CARBIDE AND CARB[illegible] COMPANY LOCATION Post Office Box P OAK RIDGE, TENN.

K-25 RC

NOT TO BE LOANED FROM PLANT RECORDS K-1034

TO Mr. A. P. Huber
LOCATION K-1001
ATTENTION
COPY TO Mr. G. H. Dykes
Dr. H. F. Henry
Mr. W. L. Richardson
Mr. M. F. Schwenn
Mr. H. G. P. Snyder

DATE November 3, 1954
ANSWERING LETTER DATE
SUBJECT Contaminant Control Production Division

KP-701

The following report contains comments and description of practices in the Production Division on the subject of protective clothing as discussed in Dr. Henry's letter(1) of July 22, and summarizes recent labor grievances and our consideration on the subject of contamination.

PRESENT PRACTICE

In studying the locations and situations listed for protective clothing we first attempted to define our practices and potential hazards and scopes. This is summarized as follows:

(a) Locations of UF_6 operations at positive pressures and locations of cylinder handling are all subject to material releases and subsequent contamination. If protective clothing are to be provided as safeguards to potential exposure, all employees at such facilities should have a complete or partial clothing change. This would involve almost everyone - the operations being, in order of experienced contamination potential: Coded Chemicals Section, K-306-7 PW, K-631, K-131 and K-33 Feed facilities, K-101, K-312, all cold trap rooms, all locations of miscellaneous depleted or enriched UF_6 cylinder side feed (all line recorder stations, etc.), all locations of maintenance and alumina trap dumping, and all sample points. Obviously, we prefer to concentrate on engineering and procedure improvements, radiation surveys, decontamination, and painting where necessary - protective clothing being issued only as absolutely necessary and practical, and as a last or temporary resort.

SECRET

(1) Proposal For Protective Clothing Issue Based on Contamination Levels - Fourth Quarter, FY 1954, H. F. Henry to A. P. Huber, July 22, 1954.

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(b) In cases of prolonged contamination involving high surface counts but no airborne contamination, the personnel concerned are aware of the situation, can guide themselves accordingly, and protective clothing is made available on a temporary basis when needed. Disciplinary or police action for enforcing the use of gloves, "booties", etc., is uncommon. The personnel have been trained in health physics requirements and guide themselves accordingly. Police action would necessitate continuous supervisory surveillance, enforced personnel monitoring, and other impractical controls.

(c) In cases of intermittent contamination or potential releases, emergency protective equipment is readily available, and protective clothing can be provided temporarily when needed. Preferably, such cases are cleaned up as rapidly as possible. There have been cases experienced in which operator's personal clothes have been contaminated; however, these men have been accommodated via company laundry service or reimbursement.

CONTAMINATION INDEX ABOVE 100

The proposal was made that the following locations be considered for a complete clothing change. Our comments to the proposals are as follows:

Vault 16-A Drum Storage - This location is subject to surface contamination from solutions that leak from deteriorated containers, and contamination from the outside of containers previously handled by contaminated personnel or within contaminated areas. Personnel in this vault are assigned to the Coded Chemicals Section and presently undergo a complete clothing change.

K-306-5 Cylinder Shop - This surface contamination originates from the exterior surface of product cylinders. Along with the installation of the product purification unit, use of these cylinders for product was discontinued. The cylinder shop has since been moved to K-303-2 to serve the withdrawal program. This facility is attended by Coded Chemicals personnel who are undergoing a complete clothing change, but for reasons other than this facility (namely, their exposure to contaminated solution handling and powder handling).

K-101 - This facility, which involves a positive pressure operation, is subject to contamination from occasional releases to atmosphere and associated cylinder handling, but the major cause is attributable to frequent maintenance (pump overhauls, etc.). Operators in this location had been furnished coveralls and shoe covers only during periods of considerable maintenance or other known unusually high contamination. However, as the result of

recent investigations, it is evident that operator shoe soles are above PAL most of the time on the job, and these employees have been issued coveralls and shoes. Experience indicates that this shoe sole contamination is readily removable; nevertheless, some residual counts in excess of PAL were still apparent when the employee returned to work. On a recent test, a supervisor deliberately walked through the most likely areas of K-101 for contamination, registered a count of 2500 on his shoe soles, walked to K-309-3 test loop, and in twenty minutes rechecked his shoe soles, getting a count of 300, which is less than PAL.

This facility is staffed with one operator per shift, but a complete clothing change would also involve the relief and utility operators and complicate the shift change relief procedure, since the unit should be under surveillance at all times. On the basis of experienced acceptable air samples and hand counts (Zeuto), no smoking or eating restrictions are imposed during normal operations, and we do not feel that any added measures, other than company shoes and coveralls, are required.

K-631 Waste Disposal - This is another positive pressure unit, also involving considerable cylinder handling and maintenance activity, all of which tend to maintain a high contamination level in spite of continuous decontamination efforts. Due to the nature of experienced violent releases in this facility and in considering the large quantities of material subject to release, the personnel on this assignment are provided coveralls and company-issue shoes, but not a complete clothing change. Clothing changes are accomplished at shift change without operational interruptions by allowing the two operators to change clothes just prior to shift change, one at a time, and then return to their station where they are relieved by the oncoming shift, already attired in coveralls and yellow shoes. Supervisory personnel or visitors do not wear protective clothing, and, at the most, would require only shoe covers since contamination of shoe soles can occur in many cases; however, any attempt to enforce complete clothing changes would seriously hamper operations. We are continuing to strive toward reduced contamination levels, and recent operating and equipment improvements should prove beneficial in this regard. On the basis of acceptable air samples and hand counts (hand counter installed), no smoking or eating restrictions are imposed.

On a recent test, a supervisor walked through K-631 with the intent of contaminating his shoe soles, and he was able to attain a shoe sole count just approaching the PAL of 500. This count then disappeared in the course of a couple of hours.

K-402-1 Basement Storage - This location became contaminated originally from the storage of contaminated equipment, and secondly as a result of a feed cylinder release in K-402-1. Operators do not wear protective clothing for their routine

work in this area. (The cell floor and pipe gallery of this unit are also contaminated but not mentioned in Mr. Henry's letter.) Operating personnel in this area are subject to shoe sole contamination. They are familiar with the situation and can avoid personal contamination other than shoe soles. No eating or smoking restrictions are imposed. Protective equipment, namely, coveralls, shoe covers, and respirators, are provided on a temporary basis for certain activities in the pipe gallery that create a dust problem. The cell floor ledges and floor were recently painted in an effort to reduce transferable contamination. Attempts at cacooning the pipe gallery have not been entirely successful.

A supervisor, in walking through this area, attained a shoe sole count of 800; however, this count disappeared entirely in the course of about three hours.

K-27 Pump Dismantling - This was a temporary job concerning the K-27 Stage Improvement Program which has been completed. The maintenance personnel involved did wear protective clothing.

CONTAMINATION INDEX OF 10-100

The proposal was made that the following locations be considered for routine use of coveralls and other protective clothing as required.

K-302-5 Cold Trap - The cold trap rooms throughout the cascade normally can be maintained free of contamination and no protective clothing is provided. Conditions in excess of PAL exist mainly from alumina trap changing, pump seal failure, and other maintenance and are generally cleaned up quite readily. No eating or smoking restrictions are normally imposed. On a recent test, a supervisor deliberately attempted to contaminate his shoes during a maintenance job in the cold trap room, in fact, he deliberately stepped in contaminated MFL oil with one shoe. There was no visible contamination. The MFL shoe sole registered 1850 meter counts; the other, 900 counts. After two and one half hours of normal job activity and walking, the counts were 750 and 200, respectively. The next morning, after wearing the shoes home, the count was 500 and 125, respectively.

K-306-7 Product Withdrawal - Coveralls and shoes are presently provided. For a period of time from K-25 plant start-up until several months ago, the PW operation was a direct withdrawal at sub-atmospheric pressures. Practically no trouble was encountered from material releases to atmosphere. Subsequent material processing via wet chemistry, however, resulted in the withdrawal and shipping cylinders becoming contaminated on the exterior surface. The material is highly alpha active. Contamination control procedures consisted of routine monitoring and decontamination of the PW station and its stainless steel floors, plus the issuance of gloves and coveralls to the operators. This proved quite satisfactory, and occasional decontamination was the only requirement for good control.

Several months ago a purification system, at positive pressures, was placed into service. Initial shakedown difficulties (particularly valve failures attributable to design) resulted in numerous material releases. Though the quantities released were extremely small, the high alpha activity presented a problem. In spite of vigorous decontamination activity and use of "booties", the operators experienced alpha counts on their personal shoes (tops and soles) in excess of PAL. A grievance was initiated on July 12, 1954, requesting company-issue safety shoes. The first step answer to the grievance indicated that the accomplished correction of design faults, plus continued decontamination and reduced contamination, appears to have eliminated the need for any protection other than "booties" and the coveralls and gloves. Nevertheless, a few weeks later in view of subsequent and continued engineering problems and releases occurring, supervision thought it advisable to issue work shoes at company expense. This is a "dust contamination" condition, and personal shoes were readily decontaminated, resulting in no problem of take-home contamination. The personnel involved have been informed that the shoe issuance is a temporary measure until adequate design and control improvements have reduced the contamination problem to within the normal range of contamination controls - routine monitoring and decontamination. Eating and smoking are not permitted on the PW ledge, cell floor, the location of cylinder handling activities. A hand counter is installed outside of this fenced area. On the basis of acceptable air samples and hand counts no further eating or smoking restrictions are imposed.

K-312 Alumina Traps
K-312-3 Basement
K-27 Booster Stations
K-402-8 Cold Trap

These situations are very similar to the conditions described under K-302-5 Cold Trap, and no protective clothing is provided.

K-302-1 Test Loop - This contamination is due to the frequent equipment changes and maintenance. No protective clothing is provided for operators. The area is decontaminated as well as practical and the only problem is possibly, occasional shoe sole contamination. No evidence of shoe sole contamination exceeding PAL has been reported. The operation of this station was recently discontinued; however, a similar situation also exists at K-309-3.

K-131 Feed Unit - This unit is presently shutdown; however, past practice did provide for coveralls and shoes as practiced in K-631. The new feed unit in K-33 is presently being operated on a basis of no floor contamination (unless experience proves otherwise) and no protective clothing, except for coveralls, are provided.

K-27 Line Recorder and Seal Exhaust Pumps - These stations are no different than in K-25 and are presently considered contamination free by virtue of frequent monitoring and decontamination. No protective clothing is provided. A recent but temporary siege of violent seal failures and associated seal exhaust trap accumulations produced an unusually high contamination index from the trap dumping and recharging activity.

K-402-2 - This unit is in a condition similar to, but slightly less severe than, K-402-1 as described under K-402-1 Basement Storage.

K-413 Side Withdrawal - The situation with this facility is very similar to the operations and procedures employed in K-631. Coveralls and shoes are provided for personnel on this assignment. A recent test by a supervisor disclosed that he picked up a maximum of 1400 counts on his shoe soles at this location. However, within one hour the count had worn off to 600, and within two hours it was below PAL.

Other - A new side withdrawal operation (not included in Mr. Henry's letter) was initiated on September 8, 1953 in unit K-303-9 utilizing the same equipment as was employed in the old K-306-7 PW and which was transferred from the K-306-7 station. Similarly, this operation involves sub-atmospheric pressures and cylinders that are externally contaminated due to subsequent material processing procedures. The source of contamination is from the cylinders external surface. When cylinders are removed from the bath, contaminated trichlor and the melting of subsequent frost drip to the floor and contaminate the floor.

This operation continued, and for the first ten months was gradually being relocated from unit K-303-9, through successive units, to K-303-5. The existence of contamination on the floor was readily controlled by routine monitoring and decontamination. The operators were advised to wear "booties" on about August 23, 1954, at which time withdrawal rates were increased and the increased cylinder traffic magnified the contamination problem. At this time supervision provided stainless steel floor coverings and rubber mats to cover the affected floor area and facilitate easy decontamination. However, on about September 1, 1954, the Union representatives of the affected operators and some of the operators themselves commenced to "gripe" regularly about their contaminated shoe soles. Supervision merely re-emphasized the use of "booties"; however, supervision did not police the use of "booties" and the operators admitted ignoring the "booties" in most cases due to the inconvenience. A recent case of highly contaminated shoe soles prompted an attempt by supervision to decontaminate the shoes. These attempts, though they reduced the alpha level, were not successful in completely decontaminating the shoes. This is apparently due to the fact that the shoes are subjected to contaminated solution which soaks the particles into the sole. However, further evidence indicates that in due time (several days) the count will wear off.

On the basis of the unsuccessful attempt of decontamination, the operators assigned to this job were issued work shoes at company expense. Two operators with Union representation continued to complain of their contaminated personal shoes, requesting replacement or reimbursement. Permanent replacement is not possible under present policy and procedure, and reimbursement, as provided for in SPP D-5-1 is not recommended or authorized by virtue of regulation 5-1.3a which states that reimbursement is made only in event the contamination was incurred as a result of conditions beyond his control. Supervision feels that sincere effort and intent on the operator's part to utilize existing facilities, prescribed procedure, and "booties" would have avoided the excessive contamination.

In the meantime the operators have continued wearing their shoes home. In both cases, the shoes have worn down to within PAL after several days.

In the near future, an anticipated equipment change and material processing change should eliminate the contamination problem on this specific job. However, the fact remains that many similar conditions exist throughout the plant and all operations personnel are subject to occasionally contacting contamination and acquiring contamination in excess of PAL on shoe soles.

General

(a) Meter readings in excess of PAL are frequently reported from all line recorder stations, alumina trap locations, cold trap rooms, etc.; but these are decontaminated as rapidly as practical and are not considered hazards worthy of protective clothing. Just recently, meter counts as high as 12,000 were reported on the floor just outside the K-302-4 canteen. Deliberate attempts to transfer the count to shoe soles were unsuccessful. If we are to realistically accept the PAL's for surface contamination, we will rapidly approach a condition of providing work clothes for everyone, and if we were to realistically enforce the purpose of protective clothing (i.e. to avoid the spread of contamination), we could not permit persons so attired to move freely through our offices, canteens, lunch rooms, cafeteria, dispensary, etc.

(b) In practically all cases, the service personnel, i.e., Maintenance and Cascade Services, are equipped with protective clothing and undergo a complete clothing change. However, it has not appeared necessary or practical to so equip the operators except for a few isolated cases.

(c) For the most part, shoe soles are very infrequently checked for contamination, and very seldom is the contamination reported or given much concern because it is generally and

rapidly removable via normal walking. However, if the Union so desires, they could instigate troublesome harassment by way of deliberate close monitoring control at opportune moments, demand application of the established PAL procedures, and, without too much difficulty, acquire company-issue shoes for the majority of our operators, plus some reimbursement.

Consequently, it is suggested that serious consideration be given to raising the PAL for personal shoe soles to a more practical limit such as 5000 meter counts or higher, for a long-term residual PAL, and a governing wipe count of about 400 or 500. PAL on shoe tops would remain unchanged.

It is interesting to note that in conducting the tests in the various locations to determine extent and retention of contamination transferable to shoe soles, most of the supervisors involved discovered that in obtaining the initial (or zero) reading on their soles, they had, and maintained, residual counts of 200 or 300.

M. F. Schwenn

MFS:HGPS:lb

DISTRIBUTION

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